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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
726 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

FEB 21 1989

MEMORANDUM

SUBJECT: Revegetation Plan Meeting, SCS, FWS, BOM, EPA, January 30, 1989

FROM: Alice C. Fuerst ACF
REMD/SPFD

TO: Files

On January 30, 1989, the Soil Conservation Service (SCS), Fish and Wildlife Service (FWS), Bureau of Mines (BOM) and EPA met to discuss the plans for developing the revegetation plan for the ground water/surface water operable unit in Galena. Lynn Gibson, SCS, chaired the meeting. Present at the meeting were the following:

Lynn Gibson, SCS
John Reh, SCS
Jim Stevens, SCS
Jim Gaskell, SCS
Scott Williams, SCS
Ronel Finley, FWS
Dan Mulhern, FWS
Don Haley, FWS
David Veith, BOM
Alice Fuerst, EPA

The purpose of the meeting was to discuss how to develop the revegetation plan. SCS has prepared a work plan for this task which was discussed. The work plan included soil sampling, analyses, evaluation of the data and writing of the plan. SCS's signed IAG and their SCS-approved work plan have been sent to Carol Rompage, EPA.

We discussed the remediation that may be conducted at the site that will need revegetation. The EPA has not made a decision on the alternative to be implemented at this time, although two alternatives are being looked at very closely. Those include: 1) Mill the mine waste and chat on the surface and dispose of tailings underground, leaving open shafts to be fenced or plugged and bare soil or 2) Pick up and dispose of the mine wastes and chat into the shafts, thus filling the shafts and collapsed areas and leaving bare soil.

The sampling plan for this work was discussed. They plan on collecting 20 samples instead of the 74 stated in the work plan. These 20 samples will be composites. Fourteen of the samples will be surface soils (the top one-foot samples), four samples will be deep samples (between 2-5 feet depth) and two duplicate samples. Soil samples will be taken from beside the chat piles because SCS does not have equipment to drill through the chat piles themselves. They expect that there will be a few inches of chat on top of their samples that they will separate out from the soil samples. Samples will include soil samples only, no waste rock samples. Composite samples will be taken to get a representative analysis for different areas. This is important since during the recontouring, much of the soil was going to be mixed together anyway, therefore, discrete samples would not be as beneficial.

The work plan had a list of analytical parameters. I questioned why boron was included in that list and explained that is a special analytical request. They stated that at coal mine sites, boron is a problem and influences the ability to revegetate an area. Parameters that had mistakenly been left off the list included potassium, calcium and pH. It has been determined that there are three soil types in the area to be revegetated. They will take samples from each of the three soil-type areas. A sample will be a composite of six aliquots from a general area. Because the soils will have some rocks mixed in with them, they will need to be prepared for analytical work. The Bureau of Mines is available to prepare samples. SCS will collect each of the samples and send them up separately uncomposited to Bureau of Mines. The Bureau of Mines will prepare each sample and then split each one into two, one portion will be saved for future use and the other one will be composited with the other five samples for the composite. Samples will be numbered so that BOM will know which samples to combine in the composites. Those samples will then be sent to the EPA Lab for chemical analysis.

SCS will need to get permission from property owners prior to sampling. To do this, they need to go to the court house to find who the property owners are. They will call those people to get verbal permission and document this in the field books.

The revegetation plan will probably recommend native grasses because that what is known to grow best in revegetating areas. The plan will probably recommend a temporary cover to be put on during the first year. The cover will be something like a sorghum which would be mowed to keep it from seeding. The cover will be planted in the second year. The sorghum will provide protective cover for the seedlings, will keep the soils moist, and will reduce the wind velocity around the seedlings.

There was discussion about whether the vegetation will uptake metals into the plants and, therefore, cause a problem through ingestion of the plants by wildlife or other animals. Gaskell suggested sampling current vegetation in the area and the soils around those to get an indication of whether the current vegetation is uptaking the metals. To find out more information about this, each of the three agencies, CSC, FWS and BOM will do a literature search to locate information on metal uptake and revegetation. They have heard that switchgrass may uptake a lot of metals into the plant. Finley said he would check with their Denver region where they have looked at revegetation of mine sites. He will check to see if they have looked at the metals uptake of the vegetation. Fuerst will locate an article written about revegetation of zinc waste piles and transmit that to Gibson. Finley suggested that he thought it would be better to plant vegetation that is not desirable by wildlife rather than to plant plants that were going to uptake the metals and then contaminate the wildlife.

The green sheet that lists the specifications used by SCS and revegetation of mine sites is not a regulation.

We reviewed the schedule and made revisions to make it more workable. Soil Conservation Service will complete and approve the work plan by March 1, 1989, there will be two weeks for sampling, two weeks to ship the samples to Bureau of Mines and get the samples prepared for analysis, the analysis will be completed by May 15, 1989 (45 days), 45 days to develop a revegetation plan, one month to review it and final report on September 1, 1989. When the sampling results are available, Fuerst will send those to each of the agencies. There will be a conference call to discuss the results and how to proceed with the revegetation plan based on results obtained from the field. Following completion of the draft report, the agencies will have another meeting to discuss the report.

Fuerst explained some of the health and safety issues with working on the site. These issues include concerns about the physical hazards at the site posed by the mine shafts and by the collapses around the shafts. There is concern also with the lead content in the dust. Fuerst advised that the field people keep their hands away from their faces so as not to ingest dust from their hands, to wash their hands before eating and not to smoke onsite. Field shoes should be removed when leaving the site so not to carry dust into other areas. Wind-blown dust is not a problem at the site, although during the sampling they may create a dust. They should be cautious not to breathe any dust that they create. Fuerst suggested that possibly dust protectors should be worn if they are creating dust during the sampling. Upon leaving the site, vehicles should be washed and vacuumed so not to expose other people to the lead. Fuerst advised that the impounded water has low pH and that none of the impounded water

or the surface streams should be used as drinking water. Galena public water supply is safe for drinking. Fuerst advised the field people to locate nearest hospital, in case necessary.

To Do List:

Fuerst advised them that a little bit of soil, up to three inches of the soil will be removed with the chat. She will need to check into this further;

Fuerst needs to check to see what we are going to do about the chat in Short Creek near Spring River. Will this material be removed or left onsite?; and

Fuerst needs to check to see what grain size and sample size is needed for each of the soil samples. What does the laboratory do when they receive soil samples that contain rock.

Re-vegetation Plan Meeting 1-31-89

Name	Phone	Agency
Alice Fuerst	913-236-2856	EPA
Jim Gaskell		Soil Cons. Srv. 316-431-6180 Chanute.
Ronel Finley	(913)539-3474	U.S. Fish & Wildlife Service - Manhattan.
Jim Stevens	913/823-4541	Soil Conservation Service - Salina
John W. Reh	913/823-4568	" "
Scott Wilson	316/429/3013	SCS - Columbus
H. Lynn Gibson	316 343 7276	SCS - Emporia, Ks
David L. Veith	612-725-4709 FTS 789-4709	BOM - Minneapolis, MN
Dan Mulhern		U.S. Fish & Wildlife Service
Don Haley		" "

SECTION VIII
Critical Area Planting (Ac.) - 342
For
RECONSTRUCTED MINED LAND

All reconstructed mined lands will be protected by vegetation that is compatible with the climate, soil materials and planned land use.

A. Grasses and Legumes

1. Types of Seedbeds

a. Temporary cover for acid sites. For a period of 1 to 3 years after land shaping, a temporary cover of a winter annual is to be used. Wheat, rye, or barley may be seeded at the rate of 80 pounds per acre. Use suitable seedbed preparation, applying a minimum of 50 pounds per acre each of available nitrogen, phosphorus, and potassium or the amount indicated by a soil test.

Prior to planting the second year temporary cover crop, soil tests will be taken as needed to determine lime requirements. Refer to Table 1 for liming rates.

For the second year of temporary cover, use the same fertilizer rates as specified above for the first year or the amount shown by soil test.

A third year temporary cover and fertilizer and/or lime may be used if needed to obtain an adequate seedbed for permanent vegetation.

Table 1
Agricultural Lime Needed to Increase
Surface Mine Spoil pH to Specified Level 1/

	Tons lime needed per acre to increase pH to	
Spoil pH Test	4.5 to 5.5 For woodland, wildlifeland and recreationland	5.5 to 6.0 For cropland, rangeland, pastureland, and hayland
Less than 3.0	8 - 10 or more	10 - 12 or more
3.0 to 3.5	5 - 7 or more	7 - 9 or more
3.5 to 4.0	3 - 5	5 - 7
4.0 to 4.5	2 - 3	3 - 5
4.5 to 5.0	1 - 2	2 - 3

1/ The rates above are based on 100 percent effective calcium carbonate equivalent.

b. Cover crop suitable for nonacid areas. Plant a cover crop like sorghum or hybrid sudangrass in a suitable seedbed at the rate of 10-15 lbs. per acre for sorghum and 20-25 lbs. per acre for hybrid sudan. Apply fertilizer for the cover crop at the rate of 30-40 lbs. per acre of nitrogen and 40-60 lbs. per acre of phosphate or in accordance with a soil test.

c. Applied Mulch. In lieu of a cover crop, the area may be mulched at the rate of 2 tons per acre of prairie (native) hay not more than two years old and free of noxious weeds. Mulch should be spread uniformly and anchored with a notched disk set straight and weighted properly. Ten tons of manure per acre may also be used as mulching material. Unless otherwise specified, mulching will follow seeding operations.

d. Clean Tilled. Just prior to planting, the seedbed shall be prepared by using necessary tillage implements which will penetrate 2-3 inches and leave a firm but friable seedbed. The seeded area shall be free of large clods, stones, and other objects that would hamper planting and maintenance operations.

2. Methods of Seeding

a. Drill. Grass should be seeded with a grass drill equipped with double coulter furrow openers with depth bands and press wheels or drag chains (press wheels are preferred). Seed should be planted to a depth of 1/4 to 3/4 of an inch.

b. Other. In areas inaccessible to a drill, seed may be broadcast or planted with a hydroseeder.

3. Seeding Mixture and Rates

a. Refer to Table 2 in this specification for species selection, seeding rates, and example. Try to match desirable species found in surrounding area. All mixtures should total 100 percent.

b. Plant Materials Technical Note KA-1 (Rev. 2) should be consulted for recommended strains, seed origin, and adaptation for locality.

Table 2
Species and Seeding Rates for Reconstructed Abandoned Mined Lands

Species	PLS lbs. per acre 1/	Min. %	Max. %
Native grasses			
Big bluestem	12.0	0	20
Blue grama	3.0	0	20
Buffalograss	10.0	0	20
Indiangrass	12.0	0	20
Kanlow switchgrass 2/	5.0	0	20
Little bluestem	8.0	0	20
Sideoats grama 7/	12.0	0	20
Switchgrass	6.0	10	30
Western wheatgrass	20.0	20	30
Introduced grasses 6/			
Tall fescue 5/	10.0	0	40
Reed canarygrass 2/	4.0	0	20
Smooth brome 5/	16.0	0	40
Bermudagrass 3/	--	--	--
Legumes and forbs 4/			
Alfalfa	14.0	0	10
Birdsfoot trefoil	7.0	0	10
Cicer milkvetch	18.0	0	10
Crownvetch 5/	9.0	0	20
Red clover	10.0	0	10

1/ Based on 50 seeds per square foot.
2/ Kanlow switchgrass and Reed canarygrass to be used for low, wet areas.
3/ Sprig at the rate of 20-30 cubic feet per acre or plant rhizome-laden sod pieces. Refer to Critical Area Planting Specification, page 342-26 for planting instructions.
4/ Not to exceed 20 percent of the total mixture. For an additional selection of native legumes and forbs. See page 342-73 of this section.
5/ Crownvetch, brome, and tall fescue will not be used in mixtures containing predominantly warm season grasses.
6/ Limited to a total of 40 percent in predominantly cool season mixtures.
7/ On high lime areas pH 7.5 and over include a minimum of 10 percent in mix.

Example: This is a sample procedure that can be used to develop a seeding mixture for both warm and cool season mixtures from the preceding page.

FOR RECONSTRUCTED MINED LAND

Species (Sample Mixture)	(a) 1/ PLS Lbs. per Ac.	(b) 1/ Percent of Mixture	(c) 1/ PLS Lbs. per Ac. in Mixture	(d) 1/ Acres to be Seeded	(e) 1/ PLS Lbs. in Mixture	(f) 1/ Percent PLS	(g) 1/ Bulk Lbs. Per Acre	(h) 1/ 2/ Total Bulk Lbs. per Species
			Warm Season Mixture					
Buffalograss	10	10	1.0	4	4.0	55	1.8	8
Sideoats grama	12	15	1.8	4	7.2	60	3.0	12
Switchgrass	6	20	1.2	4	4.8	80	1.5	6
Western wheatgrass	20	20	4.0	4	16.0	50	8.0	32
Big bluestem	12	10	1.2	4	4.8	48	2.5	10
Little bluestem	8	10	0.8	4	3.2	52	1.5	6
Indiangrass	12	15	1.8	4	7.2	40	4.5	18
Total		100	11.8	4			22.8	92
			Cool Season Mixture					
Western wheatgrass	20	30	6.0	15	90	50	12.0	180
Tall fescue	10	30	3.0	15	45	70	4.3	65
Switchgrass	6	20	1.2	15	18	60	2.0	30
Crownvetch	9	20	1.8	15	27	85	2.1	32
Total		100	12.0	15			20.4	307

1/ (a) Taken from Table 2.
(b) Select species from percentage range on Table 2. (Species having a minimum rate must be used.)
(c) (a) x (b) = (c).
(d) Total acres to be seeded.
(e) (c) x (d) = (e). PLS pounds to be ordered from the seed dealer.
(f) PLS as listed on tags on seed sacks.
(g) (c) ÷ (f) = (g). Total of column (g) may be used to set drill. When small seed box is used, the small seed and fluffy seed should be figured separately.
(h) (d) x (g) = (h). Use to check total pounds of seed received from dealer.

2/ Species total in column (h) may be rounded to nearest whole number.

c. Additional forbs and legumes that may be seeded on reconstructed mined lands.

A mixture including 3 or 4 of the following forbs and legumes may be used in addition to the selected grass mixture. This mixture may not exceed a total of 1 bulk pound per acre.

Forbs and Legumes

Purple prairieclover

Showy partridgepea 2/

Illinois bundleflower 2/

Maximilian sunflower 1/

Eureka thickspike gayfeather

Grayhead prairieconeflower

Nekan pitcher sage

Leadplant

Prostrate lespedeza

1/ May not exceed 1/4 lb. (bulk) in mixture.

2/ May only be available through the Plant Materials Center.

4. Planting Dates

a. Cool season grasses - August 15 to October 1 and December 1 to April 15

b. Warm season grasses - March 15 to May 15 (Optimum) December 1 to May 15 (Maximum)

5. Fertilizer

Fertilizer will be applied uniformly prior to seeding and mulching in accordance with the following table or at a rate recommended by a soil test.

	Pounds Per Acre			
	Nitrogen	Phosphate	Potassium	Lime
Abandoned Mine Lands	40-50	60-80	1/	1/

1/ In areas of known potassium, and lime deficiencies, apply the amount recommended locally for agricultural production or the amount recommended by a soil test.

Manure may be substituted for commercial fertilizer on the basis of 1 ton of manure being equivalent to 10 pounds of nitrogen, 5 pounds of phosphate, and 10 pounds of potassium.

6. Wildlife and Aesthetics

Grasses, forbs, and legumes shall be considered for use that will provide wildlife food, cover, nesting, and escape qualities as well as enhance beauty.

7. Management During Establishment

Weed control during establishment is important and should be carried out as needed to reduce competition for moisture and sunlight. Weeds should be mowed when they reach a height of 6 to 8 inches (rotary mower preferred). If chemicals are used in lieu of mowing, they must be federally and locally registered and must be applied in strict accordance with authorized registered uses, directions on label, and other federal or state policies and requirements. When forbs and legumes are included, chemical weed control should not be used.

8. Fencing. Refer to the practice specification for Fencing - 382 in Section IV of the Technical Guide. Chain link fences will be installed where needed for public safety. Follow specifications found in the reclamation plan for chain link fences.

B. Shrubs and Trees

Woody plantings may be used for recreation land, woodland, wildlife land, and for diversity, aesthetics, and screening on all land uses.

1. Cover. All plantings will be made after an adequate temporary or permanent ground cover has been established.

2. Species selection and spacings are shown on Table 3. Mixed plantings of two or more species are highly recommended. Select species on the basis of suitability for the intended use.

3. Planting dates. March 1 to April 15. Shrubs and trees that are containerized or balled may also be planted in October.

TABLE 3 - PLANT ADAPTATION OF SHRUBS AND TREES

PLANTS	SITE CONDITIONS					ESTABLISH METHOD				APPROX. SPACING
	Acid	Neutral	Alkaline	Wet	Droughty	Bare Root	Potted	Cuttings	Seed	FEET
SHRUBS:										
Lilacs-French or Persian	P	G	F	P	G	X	X			5
Autumnolive	G	G	F	F	G	X	X			6
American plum	F	G	F	P	F	X	X	X		6
Coralberry 1/	F	G	F	F	F	X	X		X	3
Honeysuckle-Tartarian	F	G	G	P	G	X	X			5
Sandbar willow 1/	F	G	F	G	P	X	X	X		3
Cotoneaster	F	G	F	P	F	X	X			4
Trailing raspberry	P	G	P	P	F	X	X			3
TREES:										
Green ash	F	G	F	F	P	X	X			12
Honey locust-thornless 1/	F	G	F	F	F	X	X			12
Bur oak	F	G	F	P	F	X	X		X	12
Pin oak	G	G	P	G	F	X	X		X	12
Red oak	G	G	P	G	F	X	X		X	12
Cottonwood 1/	G	G	F	G	P	X	X	X		12
Scotch pine	G	G	P	F	F	X	X			8
Austrian pine	G	G	P	F	F	X	X			8
White pine	G	G	P	F	F	X	X			8
Red pine	G	G	P	F	F	X	X			8
Ponderosa pine	P	G	G	P	G	X	X			8
Sycamore	F	G	F	G	F	X	X			12
Black walnut	F	G	F	P	F	X	X		X	12
Pecan	F	G	P	G	F	X	X		X	12
Black locust	G	G	F	F	G	X	X			8
Rocky Mt. juniper	P	G	G	P	G	X	X			8
Eastern redcedar 2/	F	G	F	F	G	X	X			6
European black alder	G	F	P	P	G	X	X			8

Key: G=Good; F=Fair; P=Poor; X=Adapted

1/ Species have little value for wildlife.

2/ Species have a tendency to spread by seed. Its use should be restricted to areas where spreading will not be objectionable.

C. Maintenance of Established Practices and Vegetation

All engineering and vegetative practices will be maintained or reapplied to perform as designed.

All applicable management practices will be used to maintain adequate cover to keep erosion within the allowable soil loss.

Dolin – What would lab do if soil samples have rock? What size sample, grain size, preservative are needed?

QUESTIONS ON SCS SOIL SAMPLING

1. Why sample only under the waste piles? Why not take some samples from beside the waste piles? yes planned

2. Why so many samples? The ore was basicly the same throughout. There was some variation but would the soils be sc different that you need so many samples?

3. I assume no samples of the waste rock itself?

4. Describe how the coring will be done to collect only the soil and not the watse rock without mixing the chat into the soil sample

5. Is boran analyses really needed? Extra analysis therefore extra cost.

6. The soil is a maximium of 3 feet deep. Will there be 2 soil horizons to sample?

7. Describe how aliquots for the composite samples will be collected and mixed to make the composite. Would ~5 aliqouts be a good number for an area? Could the number of samples be reduced if used more aliqot per sample? During removal of the waste piles and recontouring the soils are going to be mixed anyway.

8. Why are you collecting mainly surface soil samples? What is meant by surface soil, how deep?

9. SCS will need to get permission for property owners for sampling. This entails going to courthouse the find property owner, visiting with the property owners and getting signature on permission form.

10. Who is my contact person? John Reh or Lynn Gibson?

11. Schedule

Completion by July 1, 1989
Lab training –
Sample collection
Analytical (45days)
Consult w/spec to determine options
Draft revegetation plan
Review plan – EPA, BOM, FWS
Finalize plan
Submit plan to EPA

Expl. – what is meant by duplicate sample

4 deep samples (3-5 ft deep composite)
14 top 1 ft (composites)
2 duplicates or (shallow)

Agenda items for January 30 Meeting, SCS, BOM, FWS, EPA

1. Purpose of the meeting
   - To explain the purpose of the committee
   - To define who will do what
   - To get ideas on possible problems on revegetate
   - To get ideas on possible solutions to revegetation problems

2. Discuss the purpose of the committee
   - Develop a revegetation plan to be used in Galena after the waste piles are removed
   - SCS and BOM both have experience in revegetating mine waste areas.
   - FWS will assist in identifying vegetation suitable for promoting wildlife

3. Revegetation plan
   - Purpose of the revegetation is the prevent or control erosion after the removal of the waste piles

   - Revegetation must be done the cheapest possible. Limited to about $1000/acre

   - After the removal of the waste piles the following could exist: A) Bare ground with 0 - 3 feet of soil. Soil conditions unknown. OR B) Bare ground with chat (less than 1000 ppm lead content) covering the collapses and shafts, soil cover away from shafts at 0 - 3 feet.

4. Process to develop the revegetation plan
   - Soil sampling to determine the site conditions
   -
   -
   -
   - Schedule
   - Report
5. How will the committee function?

6. Health & Safety Training

7. Questions on Soil Sampling

FEB 21 1989

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REMD/SPFD

TO: Files

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We reviewed the schedule and made revisions to make it more workable. Soil Conservation Service will complete and approve the work plan by March 1, 1989, there will be two weeks for sampling, two weeks to ship the samples to Bureau of Mines and get the samples prepared for analysis, the analysis will be completed by May 15, 1989 (45 days), 45 days to develop a revegetation plan, one month to review it and final report on September 1, 1989. When the sampling results are available, Fuerst will send those to each of the agencies. There will be a conference call to discuss the results and how to proceed with the revegetation plan based on results obtained from the field. Following completion of the draft report, the agencies will have another meeting to discuss the report.

Fuerst explained some of the health and safety issues with working on the site. These issues include concerns about the physical hazards at the site posed by the mine shafts and by the collapses around the shafts. There is concern also with the lead content in the dust. Fuerst advised that the field people keep their hands away from their faces so as not to ingest dust from their hands, to wash their hands before eating and not to smoke onsite. Field shoes should be removed when leaving the site so not to carry dust into other areas. Wind-blown dust is not a problem at the site, although during the sampling they may create a dust. They should be cautious not to breathe any dust that they create. Fuerst suggested that possibly dust protectors should be worn if they are creating dust during the sampling. Upon leaving the site, vehicles should be washed and vacuumed so not to expose other people to the lead. Fuerst advised that the impounded water has low pH and that none of the impounded water

or the surface streams should be used as drinking water. Galena public water supply is safe for drinking. Fuerst advised the field people to locate nearest hospital, in case necessary.

To Do List:

Fuerst advised them that a little bit of soil, up to three inches of the soil will be removed with the chat. She will need to check into this further;

Fuerst needs to check to see what we are going to do about the chat in Short Creek near Spring River. Will this material be removed or left onsite?; and

Fuerst needs to check to see what grain size and sample size is needed for each of the soil samples. What does the laboratory do when they receive soil samples that contain rock.